AN INVESTIGATION OF THE EFFECTIVENESS OF A NONVERBAL ABILITY MEASURE TO IDENTIFY AT-RISK GIFTED CHILDREN

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NOMENCLATURE

G/T	Gifted and talented
NNAT	Naglieri Nonverbal Ability Test
OLSAT	Otis Lennon School Ability Test
SAI	School Ability Index
SES	Socioeconomic Status

CHAPTER ONE

INTRODUCTION

This chapter will focus on the underrepresentation of at-risk children in gifted programs, practices in the identification of gifted students, culturally diverse students, poor children, problems in the identification of at risk students, and a rationale for the use of group tests. Included is a statement of the problem, the purpose of the study, definitions of the terms used in the study, the significance of the study, and the research questions.

When a society is dependent upon its most able members, it should be expected that the identification of children who are gifted or talented (G/T) would be a national priority, but United States school districts fail to identify the gifts and talents of many children. Children especially vulnerable to this failure to identify are students who are the most at-risk in the current educational system (Ross, 1993).

The Underrepresentation of At-Risk Groups in Gifted Education

The *National Report on Identification* (Richert, Alvino, & McDonnel, 1982) identified groups that may be considered most at-risk for underidentification during the selection process for placement in gifted programs. Two of those groups were poor students (those students qualifying for free or reduced-price lunch) and culturally diverse students. The failure to identify gifted students from these groups is due to the heavy reliance on measures of academic achievement in the gifted identification process (USDE, 1989).

Practices in Identification of Gifted Students

Identification is necessary to provide appropriate educational experiences for gifted children. The experts and schools agree that determining how students will be identified as gifted and talented poses a delimma for schools. Within the field of gifted education, identification has been recognized as a priority, topping the list of twelve issues in a poll of 29 experts on the gifted (Cramer, 1991). Results from a questionnaire to 19,000 persons in gifted education sent by the National Research Center on the Gifted and Talented (NRC/GT) based at the University of Connecticut identified giftedness in special populations and the identification of instruments and practices used to identify gifted children as fundamental problems for gifted education (Davis & Rimm, 1998).

Experts have made recommendations to schools about practices used in identifying students as gifted and talented. Richert (1987) outlined six identification principles that districts need to consider. They are:

1. Defensibility: Base procedures on the best available research and recommendations.
2. Advocacy: Design identification instruments in the best interests of all students.
3. Equity: Ensure that no one is overlooked. Protect students' civil rights. Specify strategies to identify disadvantaged gifted students. Avoid cutoff scores to exclude students.
4. Pluralism: Use the broadest defensible definition of giftedness.
5. Comprehensiveness: Identify and serve as many learners with gifted potential as possible.
6. Pragmatism: Procedures allow for the cost-effective modification and use of available instruments and personnel.

Twelve years have passed since Richert made her recommendations, but state and districts continue to violate these principles. Perhaps because districts are ignorant of

the research, they continue to use very narrow definitions of giftedness. Richert specified that strategies should be developed for identifying the disadvantaged, yet state departments place disadvantaged gifted children on a low priority. There was no provision for disadavantagement in 38.5% of the state definitions for giftedness (VanTassel-Baska, Patton, & Prillaman, 1989).

A single measure of cognitive ability is often used, and this single score is used to exclude students from gifted programs. It would be better if districts use multiple criteria when identifying students for special programs.

Culturally Diverse Students

Some culturally diverse students have long been underrepresented in gifted programs and overrepresented in special education programs. The US. Department of Education's Office of Civil Rights reported that Blacks, Hispanics, and Native Americans were underrepresented by as much as 70% in gifted programs (Richert, 1987). Research on the underrepresentation of these students indicates that it is due largely to the identification practices being used (Renzulli, 1973; Richert, 1987). It is common practice for districts to use group achievement and aptitude tests requiring a high level of reading comprehension for placement decisions.

For some culturally diverse students poor test scores are a direct result of limited English proficiency (LEP). Changing demographics in this country demands this factor be seriously considered when choosing tests. Between 1980 and 1990 the total foreign born US population increased by 40% and the school age population in which English is not the language of the home increased by 38% (Waggoner, 1993). The 1990 US Census Report identified 14% of the total school age population who do not speak English at home (Waggoner, 1993).

To help assure the maximum opportunities for discovery of culturally diverse gifted children, changes should be made in identification practices. These changes for

culturally diverse students should include objective and subjective multiple assessment procedures and culturally and linguistically appropriate instruments (Maker & Schiever, 1989).

Children of Poverty

Poverty is a fact of life for many children. Nationally 5.5 million children under the age of 6, including one out of every four preschoolers, were living in poverty during 1996 ("More Poor," 1998). The official poverty line for a family of three in 1996 was $12,516 a year and almost half of the young children in poverty lived in families making less than half that ("More Poor," 1998).

There is a mistaken belief that most culturally diverse individuals are poor. It is also assumed that poor children are only found clustered in the inner cities of large urban areas, but poor children are found in every community and in all ethnic groups. The children from these diverse circumstances share a lack of financial resources in their home environments and, in many instances, their school environments.

A recently released study by Columbia University's National Center for Children in Poverty ranked Oklahoma for 1992-96 the fourth highest (32.03%) in the nation for the number of children under age 6 living in poverty. This was an increase of 53% from the 1979-83 poverty rates ("More Poor," 1998). In 1997 Oklahoma was considered to be the eighth poorest state in the nation, and a study, "Hunger, 1997: The Faces & Facts," conducted by the Tulsa Food Bank for a national food bank network, Second Harvest, showed 40% of northeastern Oklahoma's hungry were 17 and under (Wakulich, 1998).

Problems in the Identification of At-Risk Students

A significant finding of the *National Report* (Richert, et al. 1982) was that poor children are the ones most likely screened out of gifted programs. Gifted children usually begin the development of higher level thinking skills at home. The low SES child may not

have access to the resources and experiences found in the homes of more affluent gifted children. While the ability to develop quickly is present in the poor child, background knowledge is often deficient. Families may be unwilling or unable to provide the kind of preschool educational experiences children require to enter school ready to learn. Federal reports show only 4% of students from low SES homes score at 95% or above on standardized tests (as cited in VanTassel-Baska, Patton, & Prillaman, 1989).

Often the identification of students for gifted programming services is based only on intellectual criteria such as IQ, achievement scores, grades, or teacher nominations (Wilkie, 1985; Davis & Rimm, 1998). It is not uncommon for districts to use a single standardized group ability test score to make placement decisions. A score of 97% or above is usually the cutoff score that includes students in gifted programs. Cutoff scores should be avoided because they tend to exclude underachieving, creative, and at-risk students (Richert, 1997). A student with an IQ score of 130 will be admitted to a gifted program, but a score of 129 will deny access to gifted programs to other students. With inadequate background knowledge, the low SES child is at-risk in the gifted identification process.

Rationale for the Use of Group Tests

Group tests were developed with simplified instructions for administration and scoring to permit the examination of large numbers of subjects at the same time. Group tests are seldom as accurate as individually administered tests, and they are less accurate with younger children (Piirto, 1994). A group test should be used merely as a screening device (Piirto, 1994).

The individual IQ test remains the primary choice of instruments to be used to make decisions about identifying gifted elementary students (Alkin, 1992). Most school districts find the requirement for the administration of individual tests by a psychologist or psychometrist to be a time-consuming and costly process. Because teachers can easily

administer cost-effective group tests, school districts are often unwilling to commit the financial resources or the professional personnel to conduct comprehensive testing.

Statement of the Problem

Group ability tests should be used only for initial screening of students with high cognitive ability, but in Oklahoma there is continued use of group ability tests to make placement decisions. This heavy reliance on group ability tests still exists even though group tests have been reported to be less valid than individual tests (Pegnato & Birch, 1959).

Sattler (1973) asserts group ability test scores, in general, tend to be lower than individually administered intelligence test scores (as cited in Assouline, 1997). Because of low test ceilings, group ability tests also do not discriminate at the highest levels of giftedness making it difficult to plan appropriate services for the gifted child.

The group ability tests most commonly used by Oklahoma districts are heavily reliant upon verbal language skills. With Oklahoma's large Native American population and growing Hispanic population the use of these tests may place gifted students with insufficient verbal skills at-risk of being overlooked. If efficiency and effectiveness in identification is the main reason instruments for G/T identification are chosen by districts, it is important to locate and add to district procedures a group instrument that does not rely heavily on verbal skills for the identification of at-risk students who are G/T.

Purpose of the Study

The selection of tests and interpretation of results are significant factors in the placement decisions for gifted education programming. According to district gifted plans on file with the Oklahoma State Department of Education, a frequently used test for G/T identification is the Otis-Lennon School Ability Test (OLSAT). While this test has identified thousands of students as G/T, it may have failed to identify at-risk children. The

administration of the OLSAT relies heavily on verbal skills, and it is believed that some at-risk G/T children lacking the required verbal skills necessary for success on the OLSAT may be overlooked.

The purpose of this study is compare the newly published Naglieri Nonverbal Ability Test (NNAT) with the Otis-Lennon School Ability Test (OLSAT), both group tests of academic ability, for use in the identification of at-risk children as G/T.

Significance of the Study

Much of the public and many of the legislators who make the decisions about educational funding believe that students who are G/T make it on their own guidance and initiatives. Serious problems of underachievement, boredom, withdrawal from school, denial of talents, and behavioral disturbances may occur for students possessing great potential as a result of failing to recognize their needs and problems (Clark, 1992; Seeley, 1993). For the student who is G/T and also at-risk these problems are magnified because the needs of these students are seldom identified and few programming options for gifted are offered. Enabling support structures are not in place for at-risk gifted learners to make it on their own.

Even as the number of culturally diverse and economically disadvantaged students in public schools rise, their representation in G/T programs has not increased (Passow & Frasier, 1996). Inadequate identification approaches have allowed talent potential to go undeveloped. Borland (1996) warns that a real socioeconomic impact may occur as the gap between mainstream and minority cultures widens.

Traditional approaches in the identification of gifted children have been inadequate (Frasier, Garcia & Passow, 1995). Both society and the individual are losers if more effective identification procedures are not found to halt the loss of talent. If the NNAT is effective in the identification of students who might go unidentified on another group measure of ability, school districts will have a low-cost alternative to use in the

identification process of at risk students for gifted and talented programs.

Research Questions

1. How do the scores of the NNAT correlate to the OLSAT?
2. How does SES and ethnicity influence scores of nonverbal cognitive ability?
3. How does SES and ethnicity influence scores of verbal cognitive ability?
4. How does the NNAT correlate to the OLSAT for SES and ethnicity?

Definition of Terms

1. At-risk refers to those students who are classified as low SES regardless of their racial or ethnic background.
2. Gifted or talented (G/T) are used interchangeably to describe students with high ability or the potential for high intellectual ability whose educational needs are unmet in regular classroom settings.
3. Low SES refers to students who are receiving free or reduced school lunch prices as established through the use of federal guidelines regarding family income.
4. Nonverbal measurement refers to a test of intellectual ability in which the use of English is not required for students to complete the tasks included on the test.
5. Programming options are all of the programs that a district might employ in order to serve the educational or emotional needs of students who are identified as gifted and/or talented. These options include differentiation in any or all of the areas of curriculum, content, product, or process.
6. Culturally diverse is used to describe pupils who differ from the white mainstream majority. In this study it refers to Hispanic and Native American children.
7. LEP refers to limited English proficiency due to the lack of English or standard English being used as the primary language of the home.

8. OLSAT stands for Otis Lennon School Ability Test, a group test of cognitive ability.
9. NNAT stands for Naglieri Nonverbal Ability Test, a group nonverbal test of cognitive ability.
10. Effectiveness of an ability test is defined by the percentage of gifted children located.
11. An assessment is data gathering procedure used to help answer a question and make decisions.
12. An achievement test is a test given to measure past mastery.
13. An ability test is a test given to predict future academic success.

CHAPTER TWO

RELEVANT LITERATURE REVIEW

This purpose of this study is to compare a group verbal ability test and a group nonverbal ability test for use in identifying at-risk students as G/T. This chapter reviews the relevant literature. Topics related to this study are definitions of giftedness, the effects of the environment on intellect, identifying the poor and culturally diverse student, test bias and identification, use of multiple criteria to identify gifted students, gifted identification using cognitive measures, the role of socioeconomic status in identification, at-risk characteristics and test selection, using nonverbal test measures, consequences of failing to identify at-risk gifted students, research efforts related to the present study, and a rationale for the present study.

Defining Giftedness

Giftedness has been defined in various ways. Ancient Greek philosophers viewed giftedness as the ability to pass through stages of knowledge and higher levels of understanding faster than others. Modern theorists have defined giftedness ranging from a single high IQ score established by intelligence testing (Terman, 1925) to the combination of intellect and motivation (Renzulli, 1977). Theorists have supported the ideas of multiple intelligences (Gardner, 1983) or the possession of abilities and talents by domain (Gagné, 1990).

In an effort to expand the concept of giftedness beyond intellectual ability, the United States Congress legislated a federal definition of giftedness (Marland, 1972). The

Marland definition states:

"Gifted and talented children are those identified by professionally qualified persons who by virtue of outstanding abilities are capable of high performance. These are children who require differentiated educational programs and services beyond those normally provided by the regular school program in order to realize their contributions to self and society.

Children capable of high performance include those with demonstrated achievement and/or potential in any of the following areas:

1. General intellectual ability
2. Specific academic aptitude
3. Creative or productive thinking
4. Leadership ability
5. Visual performing arts
6. Psychomotor ability."

The definition was refined and modified in 1978 deleting psychomotor ability because it was observed that athletic programs, along with the funding for those programs, were already in place in almost every school district. These programs were providing programming opportunities to children with outstanding psychomotor ability. (US. Congress, 1978).

Most state legislation and most written district program plans for gifted education adopted the Marland (1972) definition of giftedness (Cassidy & Hossler, 1992). A recent national survey shows that 73% of school districts use a definition of giftedness based on this definition (Ross, 1993). While almost three-fourths of the states use the broad Marland definition as their basis for identifying and serving children in gifted programs, in practice many districts ignore the state definition and use a very limited general intellectual definition to identify and provide services to gifted children. This narrow definition of giftedness produces an atmosphere of elitism and excludes from gifted programming

environments where their aptitude is not recognized.

Low SES and culturally diverse children are especially neglected in the identification process because most identified gifted learners come from higher socioeconomic backgrounds (Sears & Sears, 1980; Van Tassel-Baska & Willis, 1988). Only 9% of children whose family falls below the 25th percentile on family income are identified as gifted and talented as compared to 47% of students whose parents are above the 75th percentile on family income (Ross, 1993). Economically disadvantaged children are found in all ethnic groups. Two-thirds of all poor children are white (Pianta & Walsh, 1996, p. 13). Poor children in large urban areas, poor rural areas, and on Indian reservations are seldom identified as gifted or talented (Maker, 1983: Whitmore, 1987; Davis & Rimm, 1998).

Test Bias and Identification

One reason given for some populations being underserved in gifted programming options is district reliance on group achievement and aptitude tests to identify students who are gifted or talented. Charges of test bias against culturally diverse and poor children have long been raised. Many intelligence and aptitude tests were standardized using the white-middle class, and tests contain language and activities used and valued by them. This often results in a built in bias against culturally diverse and poor children (Blake, 1981; Frasier, 1993, 1997).

Test makers listened to the critics and have greatly improved their tests which predict how well a child will do in school (Weinberg, 1989). Tests are derided for doing what they were designed for--to ameliorate judgments in placement decisions. Tests help factor out the subjectivity and prejudice that might result in certain students being denied access to some programs. In reviewing a large number of studies on test bias, Reynolds & Kaiser (as cited in Frasier, Garcia, et al., 1995) found little or no evidence of bias in well-constructed tests of intelligence.

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Test makers, in response to the critics, have improved their tests which predict how well a child will do in school (Weinberg, 1989). Still, tests continue to be derided for doing what they were designed for--to ameliorate judgments in placement decisions. Tests can help factor out the subjectivity and prejudice that might occur and result in certain students being denied access to gifted programs. In reviewing a large number of studies on test bias, Reynolds & Kaiser (1990) found little or no evidence of bias in well-constructed tests of intelligence.

Use of Multiple Criteria to Identify Gifted Students

It is recognized that using only one measure to identify gifted and talented students is an exclusionary practice. To make the process more inclusionary multiple assessment measures are recommended to give students more than one opportunity to demonstrate their skills and performance levels (Cohen, 1990). Districts who look for assessment procedures to use in conjunction with standardized IQ tests, often choose standardized achievement tests, teacher nominations, parent nominations, and checklists (Richert, 1997).

Controversy surrounds the use of multiple assessments. In the effort to make the identification procedures more defensible, districts may misuse the data they collect. Often equal weighting is given to the data collected, a practice discouraged by experts (Richert et al., 1982). Sometimes the scores of the various measures are summed to reach a criterion for selection even though the statistically derived weights of the various measures may not be equivalent. In other instances, districts devise a matrix system with multiple screening and identification measures and assign points to the child based on the score on each measure. Instead of making a student eligible with an acceptable score on any one of the measures, students must hit a certain score on the combined measures to be eligible for placement. The use of alternative assessments in this way continues to screen out the poor and culturally diverse students for whom the procedures were initially developed.

Multiple assessments should complement each other in ways that will discover talent potential that a single assessment may fail to identify. A study of the effectiveness of various measures of cognitive ability (Tyler-Wood & Carri, 1991) compared the Otis Lennon School Abilities Test, the Stanford-Binet (LM), the Stanford Binet (Fourth Edition), and the Cognitive Abilities Test (CogAT). A total of 21 students, ages 7 to 12 years took all four tests over a period of six weeks. A series of t-tests showed that the scores were significantly different on the four various measures of cognitive ability. Each

test may define cognitive ability differently, and the measure chosen may or may not showcase a child's best abilities.

Even if district uses a broader definition and seeks other ways to identify students with multiple criteria, there is no guarantee that it would identify the child who performs well in school and who is the most likely to seek a college education. In our society, this type of giftedness is needed for the formal education required to develop specialized talents required by society (Passow & Frasier, 1994). If districts desire to locate at-risk children who have the potential for superior academic performance, then assessment of cognitive processes is necessary.

Gifted Identification Using Cognitive Measures

Schools rely on test scores to identify gifted students because test scores are easier to determine and safer than more subjective measures such as teacher nominations which can be biased toward popular, English-speaking, and/or middle class students (Davidson, 1986). Some fear that to discontinue the use of IQ tests would place polite task-committed students in G/T programs and overlook the truly innovative thinkers and intellectuals (Borland, 1986). Items found on IQ tests use concepts and skills contained in school curricula, making them good predictors of school success (Clark, 1992).

While there is a call to find alternatives to IQ tests, High and Udall (as cited in Lynch & Mills, 1993) said most nontraditional assessments have been found to be less sensitive, more biased, or more unreliable than standardized measures. Pendarvis, Howley, and Howley (1990) recognize the lack of necessary validity and reliability in substitutes for standardized tests.

A study by Scott, Deuel, Jean-Francois, and Urbano (1996) of 431 multi-ethnic kindergarten children in the Dade County Public School System demonstrated that a child's performance on a cognitive battery of tasks could be effective in identifying gifted minority children with superior cognitive ability. Low socioeconomic status was widely

represented in the sample, and the percentage of students on free or reduced lunches in the 28 schools involved in the study ranged from 20 to 92. Thirty one students identified by the district as gifted served as a criterion reference group. The researchers developed 8 nonverbal tasks effective in identifying at-risk gifted children. The tasks involved picture recognition, word meanings, dot matrix oddity, rhyming, unstructured information, and structured information and identified as gifted an additional 8 students in the study. Seven of those children were minority students.

The Role of Socioeconomic Status in Identification

In the existing multiracial and multiethnic society there are great differences between and among groups in the economic resources available to families. One in four children live in poverty. The gap between low SES and high SES is widening. The risk of school failure increases with intergenerational poverty because there is often lower parental expectations of children, lower educational level of family members, and poorer general health and nutrition (Seeley, 1993).

Socioeconomic background effects on academic development and achievement have been documented (Sattler, 1973, Van Tassel-Baska, 1991). Students from economically disadvantaged homes experience significant educational disadvantages as compared to gifted students who are economically advantaged (Natriello, McDill, & Pallas, 1990). At-risk students may exhibit low reading comprehension and lack general knowledge and often experience a lack of exposure to educational materials in their home and school environments.

Poverty along with co-factors 1) single parents, 2) parents with low educational levels and literacy scores, 3) unemployed parents, and 4) young parents are associated with lower cognitive test scores and school achievement in young children (Brooks-Gunn, Klebanov, & Duncan, 1996). In general, economically disadvantaged children have lower scores on aptitude tests than middle class white children (Borland & Wright, 1994). On

average, culturally different learners score 15 points lower than middle class students on standardized intelligence tests (Davis & Rimm, 1998). Low SES has a negative affect on standardized scores even for the most able student and encompasses all ethnic groups (Van Tassel-Baska & Willis, 1988). Only a small number of states use low SES as a frequently used factor for identifying gifted students. Data on the number of at-risk gifted students being served by a state are not kept by 88.5% of the 50 states and these states use norm-referenced tests to identify the at-risk gifted (Van Tassel-Baska et al., 1989).

McKenzie (1986) reports findings in a study concerning the influence of identification practices, race, and SES on the identification of gifted students. The study was conducted by surveying all of the school districts in New Jersey. It was discovered that Asians and Whites had the highest incidence of participation, while blacks, Hispanics, and Native Americans were underrepresented in relation to their share of the overall population. The percentage of participation of students in gifted programs increased as socioeconomic status rose. Students in more affluent districts also had a higher likelihood of participation in gifted programs.

Districts need to realize not all poor and culturally diverse children are equally and negatively affected by their environments or language differences. Some of these children could easily meet the selection criteria, but are overlooked because they are labeled as a member of a group possessing deficiencies rather than seen as individuals with abilities, talents, and needs.

Mercer (1972) in a study of socio-cultural factors in testing selected five modal characteristics of 2200 white children on which a well-known IQ test was standardized. These modal characteristics included two parents, four or fewer children, a father with a job rated 30 or above on an occupational rating scale (Duncan Socio-Economic Index) and a mother with aspirations for some college for the children. The families either owned their own home or were planning to buy a home. The test was administered to a group of black children with the same five modal characteristics. The results were a mean IQ for

the black children exactly the same as the mean of the test. The spread of scores was the same as the norm group. The ceiling range or the test was 160. One-half of the blacks outscored half of the whites in the norm group. As the modal characteristics were decreased, so did the number of higher IQ children found. The same patterns in scores were found when applied to Chicano children. It seems that familial characteristics and economic status play a role in who is identified for gifted programs. One goal for gifted programs is to locate and develop high IQ children from families living in poverty.

At-risk Characteristics and Test Selection

When selecting measures to use in identification cognitive characteristics identified with at-risk children should be determined. A review of the literature (Rycraft, 1990) identified several characteristics of at-risk gifted children that should be considered when identification instruments are selected. Low knowledge and vocabulary are negative characteristics that may be displayed by at-risk students. Even with these deficits low income gifted children share more in common with other gifted students than with other low income children (Clark, 1982). Gifted at-risk children may display nonverbal fluency and have well developed memories and observational skills (Rycraft). Low income gifted children may also be more adept at solving real problems than their more advantaged counterparts (Begoray & Slovinsky, 1997). Poor students may have a low proficiency in English.

There is a lack of instruments for use in identifying gifted minority language students. Many procedures that rely on oral or written language skills for G/T identification were developed for use with English speaking middle class white children. Meeker and Meeker (1973), Valencia (1983), and Laosa (1984) all produced studies demonstrating that performance on verbal versus performance scales differed for minorities and whites. Districts should avoid tests dependent on English vocabulary or comprehension (Clark, 1982).

Characteristics of gifted Native American students include strong visual spatial skills, strengths in observation, problem solving, and memory. They may have difficulties in semantic and classification areas (Sisk, 1987). Sisk supports her claims citing studies by McShane (1980) and Kleinfield (1971) that reported findings of superior or relatively high visual-spatial functioning and depressed language skills in Native American children.

Using Nonverbal Test Measures

Tests should be selected to reduce cultural and linguistic bias (Cohen, 1990). Districts should seek other methods of identification which do not stress the verbal skills emphasized on traditional measures. One way this may be accomplished is through the use of nonverbal measures of ability. The frequency in the use of nonverbal tests to identify gifted children is increasing (Bittker, 1991).

There are mixed results concerning the use of nonverbal tests for identification of gifted disadvantaged children. Culture-faire tests which focus on nonverbal skills, believed to be more independent of culture, have been less adequate predictors of academic performance (Cunningham, 1986). Nonverbal instruments have insufficient standardization to be precise in the identification of gifted students (Matthews, 1988). There has been difficulty in locating a consistently reliable nonverbal IQ screening instrument. (Kaylor, 1992). Haznedar and Chisom (1981) found results for a student may vary when he or she is evaluated using several nonverbal instruments.

Consequences of Failing to Identify At-Risk Gifted Students

Access to gifted programs by students with high potential is critical for both society and the individual. Smith, LeRose, and Clasen (1991) in a study of the 12 year Lighthouse Project by the Racine United School District determined that unplaced, ethnic minority students who were identified as gifted in kindergarten, when compared to similar group of students who were placed in gifted programs, were more likely to have dropped

out of school and less likely to have gone on to college. None of the 24 students included in gifted programming dropped out of school, while 45% of the 67 equally able but unplaced children dropped out of school. The decision about each student's assignment to either the treatment group or the control group was random and equitable, but the results for the unplaced students were disastrous.

There is a strong relationship between dropping out and family SES. "The underachievement and higher dropout rate for minority group students is a function of poverty, not race or ethnicity" (Seeley, 1993, p. 265). As SES rises, dropout rates decline. Increased school performance, determined by test scores, also causes a decline in the dropout rate for all cultural groups (Curley, 1992).

Research Efforts Related to the Present Study

Nonverbal measures of intellectual functioning can increase the chances of disadvantaged gifted students being identified. There has been some success in the use of nonverbal measures as part of a comprehensive battery of testing and assessment (Baska, 1986; Nasca, 1988). Samuda (1975) demonstrated there was no significant difference between black, white, and Hispanic children on a nonverbal test like the Draw-A-Man test.

Nasca (1988) conducted a series of studies to assess the results of using multiple measures of intellectual functioning regarding the identification of intellectually gifted children. Three separate populations of elementary children were used. The studies compared the traditionally used WISC-R, Slosson, and Otis-Lennon with the Test of Nonverbal Intelligence (TONI) and Raven's Progressive Matrices (RPM), both nonverbal measures of intellectual functioning. Both of these tests are primarily used in individual testing situations. Each study paired one of the traditional measures with one of the nonverbal tests. The correlations between all pairs of measures were lower than correlations reported in the technical manuals. Nasca's studies demonstrated that the

addition of a nonverbal measure to the identification process could influence between 6.9% and 28.6% of the decisions to identify students as intellectually gifted.

Mills and Tissot (1995) conducted a study of the Raven Progressive Matrices (RPM), a nonverbal test, and the School and College Ability Test (SCAT), a test of verbal and quantitative reasoning. The subjects consisted of 347 ninth grade students from a large urban New York high school and included 75% minority students. Forty-seven of the sample qualified for free and reduced lunch. The RPM identified more students with academic potential, while minority groups were greatly underrepresented on the SCAT. Free lunch status in this study correlated so highly with limited English proficiency ($r=.62$, $p<.001$) that many of the poorest students did not take the SCAT.

Tyler-Wood and Carri (1993) investigated test bias as it affects low SES children for placement in gifted programs. The researchers used a battery of cognitive tests including the Otis-Lennon School Abilities Tests (OLSAT), the Slosson Intelligence Test-Revised (SIT-R), the Matrix Analogies Test (MAT), the Stanford-Binet 4th Edition, and the Cognitive Abilities Test (CogAT). The 39 rural students who participated in the study were divided into two groups, low SES backgrounds and average to above average SES backgrounds. Independent *t*-tests on the nonverbal and quantitative sections of the CogAT showed no significant differences in scores between the two groups, but the control group scored significantly higher ($p<.05$) than the low SES group on the verbal portion of the test. Independent t-tests on the OLSAT scores did not yield any significant differences between the two groups. Using independent t-tests for the Stanford-Binet the two groups showed no significant difference on most of the test, however, there was a significant difference ($p<.05$) between the two groups on the verbal portion, with the low SES group scoring 13 points lower. On the SIT-R independent t-tests identified significantly lower scores ($p<.05$) for the low SES group than for the control group. The Matrix Analogies Test showed no significant differences on the scores for the two groups, but only 2 students in the sample (one of those was in the control group) were identified.

The researchers speculated that the ceiling on the MAT was too low to allow students to meet the cognitive abilities criteria.

A Rationale for the Present Study

It is inappropriate to use tests developmentally to identify potential and to locate deficiencies and strengths for the purpose of prescribing instruction (Lynch & Mills, 1993). It is inappropriate, however, to rely strictly on identification measures requiring proficient verbal skills if a deficiency in such skills is a direct result of low SES or cultural diversity and it keeps an at risk gifted student from being identified as gifted and talented. Using a combination of assessment instruments can help to adequately measure a student's ability for effective participation in gifted programming options (Cohen, 1990). Districts must continue to seek out other instruments to help them efficiently and effectively identify gifted students.

The state of Oklahoma requires composite scores in the top 3% on an intellectual ability test to obtain funding for an unlimited number of students. While the state allows funding for additional gifted students falling short of the top 3%, they will not fund more than an additional 8% of the district's average daily attendance. The district in this study was looking for a nonverbal ability test because many of the students were not meeting the requirements for the full scale score, but often had nonverbal ability scores on the Otis Lennon subtest of 97% that would qualify them for placement under the additional 8% criteria. The Naglieri Nonverbal Ability Test (NNAT) was new on the market, and the district chose it because Native Americans and Hispanics were the prevalent minorities served by the district, and the publisher claimed the NNAT could help identify gifted students with low English proficiency. The study needed to be undertaken because no research was available on the NNAT, and the district had already given the test. Research should be conducted on new instruments to help districts make wise decisions for all of their students concerning the difficult task of selecting and using identification procedures.

CHAPTER 3

METHODS

The purpose of this study is to compare a traditional group test of cognitive ability, the Otis Lennon School Ability Test, Sixth Edition (OLSAT-6) with a new ability test, the Naglieri Nonverbal Ability Test (NNAT) for use in the identification of gifted students. This chapter discusses the subjects, the instruments used in the study, the procedures, and the data analysis.

Subjects

The subjects were 211 elementary students (98 females and 113 males) who were in grade 5 in a small suburban school district in northeastern Oklahoma during the 1997-1998 school year. There were ten classes of fifth graders in the district, all attending the same school. Each class of students was taught by a team of two teachers. The students ranged in age from 10 years 1 month to 13 years 2 months. The ethnic make up of the group was as follows: 1 Black, 1 Asian, 8 Hispanics, 18 Native Americans, and 183 Caucasians.

Two groups were formed based on socioeconomic status. Fifty eight students were classified as low SES (based on qualifications for free and reduced lunch price) and 153 students were placed in the group consisting of all economic classes except low SES.

Instruments

This study used two cognitive ability instruments, the Otis-Lennon School Ability

Test, Sixth Edition (OLSAT-6, 1989) and the Naglieri Nonverbal Ability Test (NNAT, 1997). The OLSAT has long been used in programs across the country as a screening and identification instrument for gifted students on the basis of IQ. The NNAT was newly published in 1997.

The Otis-Lennon School Ability Test

The Otis-Lennon School Ability Test was developed by Arthur S. Otis and Roger T. Lennon. It has been published since 1977 by the Psychological Corporation. The OLSAT is one of the most commonly used group ability test used by schools (Piirto, 1994). The theoretical basis of the test comes from the Hierarchical Theory of Human Abilities, and the test measures the verbal-educational portion of the hierarchical structure. It measures some of the abilities that could be categorized as verbal-educational, but not all of them. The OLSAT is considered a measure of a set of developed behaviors rather than a measure of innate capacity. This test is useful for predicting success in cognitive, school-related activities.

The OLSAT-6 has seven levels from Kindergarten through grade 12 and provides 2 equivalent forms for each of the levels. The OLSAT-6 is a group administered test designed to measure abstract thinking and figural, pictorial, and quantitative reasoning ability. The sixth edition classifies items into verbal and nonverbal items. An item is classified verbal if knowledge of the English language is required to answer the item.

The test used in this study is the OLSAT-6, Level E for grades 4-5. It is self-administered, includes 72 items, and requires 40 minutes for the student to complete. The test is available from Harcourt Brace Educational Measurement. The test is sold only to accredited schools and school districts.

The test may be machine scored or hand scored. The OLSAT-6 can provide three scores: verbal, nonverbal, and total. Each test in the battery yields a single score, a School Ability Index (SAI), which is considered a measure of school learning ability. The index is

scaled for a general school-age population and has a mean of 100 and a standard deviation of 16.

After an initial tryout of 35,000 students from 65 schools across the country, the OLSAT-6 was normed using approximately 310,000 pupils from 1000 school districts. The sample mirrored the US. school population with respect to ethnicity, enrollment, geographic region, urbanicity, socioeconomic variables, and handicapping variables. SES status was divided into five levels with approximately 20% of the students coming from each level. Low SES comprised about 20% of the sample. White students made up 73% of the sample with African Americans and Hispanics comprising 17% and 7% respectively. There is no standardization specifically given for Native Americans.

The KR-20 estimates of reliability of OLSAT scores range from .91 to .95. For most of the age groups the standard error of measurement is approximately four School Ability Index (SAI) points. The reliability ranges from .84 to .92 (Williams, 1989).

Concurrent and predictive validity coefficients were determined by correlating the OLSAT with scores on the Metropolitan Achievement Test and the Stanford Achievement Test. Most of the coefficients range between .40 and .60 (Williams, 1989).

A study sponsored by the U.S. Office of the Gifted and Talented (Alvino, McDonnel, & Richert, 1981) surveyed 1,000 sources to ascertain and assess the then current instruments and procedures being used to identify gifted and talented children. Two-hundred completed surveys were returned. Approximately 120 tests, instruments, and techniques were listed by the respondents. The surveys indicated that the Otis-Lennon Mental Ability Test was being used to identify students in all five of the federal categories--general intellectual, specific academic, creativity, arts, and leadership even though this is not what was described in the publisher's test manual.

The Naglieri Nonverbal Ability Test

The NNAT is a language-free test for students ages 5 to 17 that is used to screen

for general ability. It was developed and written by J.A. Naglieri after a decade of research on his previously published tests including the Matrix Analogies Test. The NNAT is an extension and revision of the Matrix Analogies Test--Expanded Form and the Matrix Analogies Test Short Form.

The publisher claims the NNAT is a culture-fair measure of school ability. It may be used to identify potentially gifted and talented students who have limited or no proficiency in English, students who are underachieving because they do not know English, at-risk students who are underachieving because of low verbal ability, and students who may be learning disabled. It is also designed to be a fair assessment for economically disadvantaged students.

The NNAT is published by Harcourt Brace & Company. The NNAT has seven levels, A to G. The level to be used in this study is Level E (Grades 5-6). The Norms Book comes in two parts, one for fall and one for spring. The NNAT is a B-level product that requires a qualification form along with credentials to support the form.

The NNAT is a group administered test that takes 30 minutes to complete. The content is completely nonverbal and the instructions are short. Simple instructions in various languages are available. The test can be administered by bilingual educators, testing coordinators, gifted and talented teachers, special educators, and school psychologists. The test may be hand scored or sent to the company for scoring.

The NNAT is a test of general ability that requires students to use their reasoning and problem-solving skills with figural matrixes. Each of the levels has 38 items that progress from easy to hard. All of the information needed to solve each item is included in the item. Students do not need factual knowledge, vocabulary, reading skills, or mathematical computation ability to solve the NNAT items. All of the items require the student to look at relationships among parts of a design and decide which response is correct based on the information in the item.

The NNAT includes different types of items and provides separate scores for

Pattern Completion, Reasoning by Analogy, Serial Reasoning, and Spatial Visualization. Pattern Completion items use a large rectangle that includes a design with a missing portion, and students are to select the choice that correctly completes the pattern. In the Reasoning by Analogy items students are working in more than one dimension and must recognize a logical relationship between several geometric shapes to determine how the objects change as they move across the rows and down the columns of the design. The Serial Reasoning items require the student to recognize the sequence of shapes and how they change throughout the design across the row horizontally and the columns vertically. Spatial Visualization items require a recognition of how two or more different designs would look if combined; they are the most difficult items on the test.

The NNAT assesses independently of the school curriculum so that prior school learning does not influence the scores. It was standardized using more than 100,000 students across the United States using the 1990 U.S. Census regional definitions to obtain the target percentage of the population for each region: West, 31.9%; Midwest 24.1%; South, 24.2%; and Northeast, 19.8%. The sample was also broken down by urbanicity: Urban, 26.6%; Suburban, 47.3%; and Rural, 25.8%. Each socioeconomic status percentage of U.S. population was 20% for each of category: low, low/medium, medium, medium/high, and high (NNAT Multilevel Technical Manual, 1997, p. 7). Eighteen Oklahoma school districts took part in the norming process. These districts were primarily small rural districts. Six districts participated in the fall norms, while 12 participated in the spring norms. One district participated in both norming procedures.

The Technical Manual (1997, p. 33) reports that the Kuder-Richardson Formula #20 reliability coefficients for the all the levels of the NNAT ranged from .83 to .93. For Level E, Grade 5 the Fall reliability coefficient was .84. The standard error of measurement ranged from 2.49 to 2.62. For Level E, Grade 5 the Fall standard error of measurement was 2.64.

The content validity must be determined by each person who uses the test. The

user must decide if the items are actually assessing the ability stated in the content section of the technical manual and whether the task is related to school learning. The criterion-related validity was established using the NNAT and the Stanford Achievement Test (SAT-9), Form S. For the Fall standardization sample the correlation coefficient between the two measures ranged from .48 to .68. Level E, Grade 5 had a correlation coefficient for the NNAT and the SAT-9 of .63 (NNAT Multilevel Technical Manual, 1997, p. 40).

Because this is a newly published test, no research articles or test reviews on this test were available at the time of preparation of this study.

Research Design

An ex post facto group comparison design was used to determine if there were significant differences between scores for low SES students and high SES students on the OLSAT-6 and the NNAT. Students were divided into two groups based on socioeconomic status as determined by school records. Students who were receiving free or reduced lunch were classified as low SES. All other students were classified into the All Others group. Students in both groups were divided into subgroups by ethnicity. Scores were obtained from archival school district data for each subject in both groups for both the OLSAT-6 and the NNAT and recorded on a records review form (Appendix A).

The dependent variables were the scores on the OLSAT and NNAT. The independent variables studied were SES and ethnicity.

Procedures

Approval for the use of human subjects in this study was granted from the Oklahoma State University Institutional Review Board (Appendix B). Permission to use archival school data on ability test scores, gender, ethnicity, dates of birth, and SES was requested from the Assistant Superintendent of Instruction and the District Coordinator of Gifted Education. Permission was granted by the school district for use of their archival

data (Appendix C). Archival data on test scores for both the OLSAT-6 and NNAT along with data on gender, race, SES, and current gifted placement was provided by the district for all fifth grade students enrolled at the time of the test administrations. The archival test data and information was collected using a records review (Appendix A) from the counselor's confidential test scores files, lunch records, students' permanent records and enrollment forms. The data was coded using a preestablished code (Appendix D). At no time during the data collection and data analysis stage did the researcher come in contact with any of the subjects involved in the study.

All students took both the OLSAT-6, Level E, Form 1, and the NNAT, Level E. Testing was held during a three week period during October and November, 1997. Tests were taken approximately one week apart.

Test administrators were the students' regular classroom teachers. Each teacher in the team was randomly selected by the school counselor to administer either the OLSAT-6 or the NNAT to each group of his or her students. The counselor held a briefing session for the teachers to go over the administration procedures prior to the testing. To assure that all students received exactly the same testing instructions, written protocols for test directions developed by the publishers was read to the students.

Classes were randomly selected as to the order in which the tests were taken. In an effort to cancel any order effect that might take place because of the sequence in which the tests were administered, half of the students took the NNAT first and then the OLSAT-6. The second group took the tests in the reverse order. Make up times were scheduled for any student who missed a test administration. Make up tests were done outside of the regular classroom in group settings by either the counselor or the gifted education specialist.

Oklahoma state statutes mandate tests scores be valid for three years, but allow scores to be valid for the student's entire school career. The district's policy is to retain students identified as G/T in gifted education programming without additional testing

throughout their school career or until withdrawn from programming options by the parent. Fifth grade students who had been previously identified and were participating in gifted programming options were also administered both tests by the district. A student's placement in gifted programming options was not negatively affected as a result of his or her participation in the district study.

OLSAT tests were scored by hand by the counselor with scoring keys purchased from the publisher. NNAT scores were hand scored by the gifted education specialist with scoring keys purchased from the publisher. School Ability Indexes and Nonverbal Ability Indexes corresponding to scaled scores by age were determined through the use of the Fall Norms. Acceptable test scores as defined by the district's written plan on gifted education on the OLSAT, currently the identification instrument used by the district, was used to place formerly unidentified students in gifted programming options.

All students were assigned a number from 001 to 211 based on the number assigned to the data sheet on which their information was initially recorded. A master list was kept of this information until the completion of the data retrieval and then it was shredded. No names were used on the data record form. Data was collected in numerical form for the following scores on both the OLSAT and the NNAT: Ability Index, Percentile, Stanine, Raw Score, and Normal Curve Equivalent (NCE). Data was stored in a locked file cabinet at the home of the researcher and will be destroyed in one year.

In an effort to conceal the identity of any subject, identifying information was coded (Appendix D). Ages were recorded in years and months. Ethnic backgrounds were letter coded as follows: A-Native American, B-Caucasian, C-Black, D-Hispanic, and E-Asian. The SES categories were coded using a two letter code: GH-Low SES (as defined by free or reduced lunch participation) and IJ-All Others SES. Gender was classified with a letter code: females-Y and males-Z. The status of a student's current participation in a gifted program was classified as follows: K-yes, L-No.

Data Analysis

Data was entered into a data base using the established coding system. A Microsoft Excel program, version 4.0, was used to record the data. The Analysis Tools program was used to conduct the descriptive statistics data analysis. Scores on the OLSAT and NNAT were compared by computing the mean, standard deviation, and ranges for each test, and the correlation coefficient.

In order to determine the average performance of both the Low SES and All Others groups, the means were calculated. Standard deviations were computed to determine the spread of the scores. Independent and dependent *t* tests were computed by hand to analyze the data for any significant differences between groups.

CHAPTER IV

RESULTS

This study was designed to investigate whether the Naglieri Nonverbal Ability Test (NNAT) and Otis Lennon School Ability Test (OLSAT) were effective in identifying low socioeconomic and culturally diverse children who may be gifted. In this chapter the results of the statistical analysis for each research question are reported. Findings concerning additional questions that arose during the course of data analysis are also reported.

This study was conducted to research the NNAT, an ability test recently placed on the market, and the OLSAT which has been a standard in ability testing for decades. The OLSAT was chosen for the study because it is the instrument of choice for identifying gifted students in the district from which the research data was gathered. The district recognized that some students who are from culturally diverse or economically or educationally deprived environments may have difficulty with the OLSAT which relies heavily on verbal ability for its administration.

The district was in the market for a nonverbal ability test that could help identify gifted students from the Native American and Hispanic populations that make up the majority of the district's minority students. The NNAT was chosen for a pilot study with one grade, because it was a test that required no verbal ability to answer the various items. It was believed this test could identify gifted students being missed in the screening and identification processes because of their ethnicity or low SES status.

Initially 224 students were tested over a two week period using both the OLSAT and the NNAT. Two students moved before testing could be completed and 11 students

were dropped from the study because of an irregularity in the testing procedure. The remaining 211 students were divided into two groups based on SES status. The first group was the Low SES students who qualified for free and reduced lunch. The second group was called the All Others because no stratification of economic status could be determined from school records.

TABLE I

DEMOGRAPHIC CHARACTERISTICS OF SUBJECTS

Demographics	n
SES Status	
Low SES	58
All Others	138
Ethnicity	
Native American	18
Caucasian	183
Hispanic	8
Black	1
Asian	1

Research Question 1

How do the scores of the NNAT compare to the OLSAT? As would be expected, some students scored higher on one test than on the other. The number of students who scored higher on the OLSAT numbered 109; 90 students scored higher on the NNAT; and 13 students had identical scores.

Both tests reported means in their technical manuals of 100. The subjects' NNAT scores had a lower mean (98.76) than the OLSAT's scores (100.06). The OLSAT's SD was 15.52 which is very close to the norm deviation of 16. The NNAT reports a SD of 15, but the subjects' SD was only 12.90.

When correlated with each other, the NNAT and OLSAT were moderately correlated (r=.61). A dependent t test was conducted and a t^* was -1.48. This indicated the difference in the means was not statistically significant ($p > .05$, 209). Table II presents the means, standard deviations and ranges for both tests for all students tested.

TABLE II

MEANS, STANDARD DEVIATIONS, AND RANGES FOR THE NAGLIERI NONVERBAL ABILITY TEST AND THE OTIS LENNON SCHOOL ABILITY TEST

TEST	n	M	SD	Range
Naglieri Nonverbal Ability Test	211	98.76	12.90	61
Otis Lennon School Ability Test	211	100.06	15.52	76

Research Questions 2 and 3

How does SES and ethnicity influence nonverbal cognitive ability? How does SES and ethnicity influence verbal cognitive ability? Minority groups were not adequately represented in the study so ethnicity could not be examined. Because questions 2 and 3 were interested in how SES influenced group ability test scores, the 211 students were divided into groups based on economic status--Low SES and All Others. Low SES was defined as receiving free or reduced lunch price. No other data that could indicate more stratified income levels of students was available from school district records, so students who were not on free or reduced lunch were classified as All Others without discriminating between middle and high income levels. Fifty-eight students were classified as Low SES and 153 students were classified as All Others. The results for both tests based on SES status are reported in Table III.

On the NNAT the Low SES students had a lower mean (94.69) than the All Others group (100.30). There was also a smaller range of scores on the NNAT for the Low SES group (53) versus the All Others group who had a range of 61. On the OLSAT the difference in range between the two groups was only 6 points.

While the Low SES group's mean score (94.48) was nearly the same as its score on the NNAT, the All Others group's mean (102.17) was slightly higher. This resulted in almost one-half of a standard deviation difference in the mean scores. The standard deviation difference (1.52) between the two groups was also slightly larger for the OLSAT.

Independent *t* tests were conducted on the means of both tests. The observed values of *t* was -2.92 for the OLSAT and -2.06 for the NNAT. It was concluded there was statistically significant ($p < .05$, 209) differences between the Low SES group and the All Others group for both the OLSAT and the NNAT, though the difference was smaller on the NNAT.

TABLE III

COMPARISON OF MEANS, STANDARD DEVIATIONS, AND RANGES ON THE NNAT AND OLSAT BY SES STATUS

		NNAT			OLSAT		
SES Status	n	M	SD	Range	M	SD	Range
Low SES	58	94.69	12.47	53	94.48	14.05	70
All Others	153	100.30	12.77	61	102.17	15.57	76

Research Question 4

How does the NNAT compare to the OLSAT for SES and ethnicity? The district has few minorities and there was not an adequate sample to look at ethnicity in regards to

SES status, but Table VI presents data on the means, standard deviations, and ranges for each ethnic groups--Native American, Caucasian, and Hispanic. There was only one subject in each of the Black and Asian categories, so information about these groups is not included on Table IV.

TABLE IV

BREAKDOWN OF NNAT AND OLSAT FULL SCALE SCORES BY ETHNIC GROUP

Group	n	M	SD	Range
Native American				
NNAT	18	96.11	13.72	41
OLSAT	18	95.67	18.81	64
Caucasian				
NNAT	183	99.23	12.68	61
OLSAT	183	100.63	15.16	76
Hispanic				
NNAT	8	94.50	16.95	48
OLSAT	8	98.25	16.19	58

The three minority ethnic groups all had ranges similar to the whole group's range. Ranges for the groups were 10 to 23 points larger for the OLSAT. The difference in the means on the two tests for the Caucasian group was 1.4. The Native American group's mean difference was the smallest at .44, while the Hispanic group's mean difference was the largest at 3.75.

The standard deviations for the groups showed opposite results. The smallest difference in standard deviations on the two tests was for the Hispanic group at .76. Next was the Caucasian group whose standard deviation difference was 2.48. The Native

American group's difference in standard deviations (5.09) more than double the Caucasian group.

Scores for Caucasian children based on SES status was computed (Table V). Forty-seven Caucasian children were identified as Low SES using the free and reduced lunch price criteria. In the All Others group, 136 Caucasian students were placed. Once again the results showed larger ranges for both groups on the OLSAT than for the NNAT. On the NNAT the means for the two groups were very similar 97.34 (Low SES) versus 99.89 (All Others). An independent *t* test was conducted with an observed value of -1.16 indicating there was no significant difference ($p < .05$, 181) between the two Caucasian groups when administered the NNAT.

TABLE V

MEANS, STANDARD DEVIATIONS, AND RANGES
ON THE NNAT AND THE OLSAT FOR
CAUCASIAN CHILDREN GROUPED BY SES

Test	n	M	SD	Range
NNAT				
Low SES	47	97.34	11.47	50
All Others	136	99.89	13.05	61
OLSAT				
Low SES	47	96.36*	13.76	69
All Others	136	102.11	15.39	76

*$p < .05$

On the OLSAT there was a larger discrepancy between the means of the two groups. The Low SES group's mean was 96.36 and the All Others group's mean was 102.11. The *t* observed was 2.21, and it was concluded when using the OLSAT to screen Caucasian children for gifted programs, there was a statistically significant difference

($p < .05$, 181) between the scores for the Low SES group and the All Others group.

Additional Questions

As the data were being collected and analyzed, additional questions began to form. Did the order in which the tests were taken affect the outcome of the scores for the various groups? How did the students who had previously been identified by the district compare on the two measures of ability? Unusually large discrepancies between the two test scores for apparent for some students. How many students were affected and how large were the discrepancies?

Order Effect on Testing

The district, aware that an order effect might take place, had chosen to give the tests in a split half fashion. Half of the students took the NNAT first, then the OLSAT; the second half of the students took the OLSAT first and then the NNAT. Did the order in which the students took the tests affect the outcome of the scores (Table VI)?
In analyzing the data, the 116 students who took the NNAT first were classified as Group I. The 95 students who were administered the NNAT last were classified as Group II.

TABLE VI

MEANS, STANDARD DEVIATIONS, AND RANGES FOR ALL STUDENTS BASED ON THE ORDER OF TEST ADMINISTRATION

	GROUP I					GROUP II				
Test	n	order	M	SD	Range	n	order	M	SD	Range
NNAT	116	1	97.23	13.49	57	95	2	100.60	11.96	59
OLSAT	116	2	98.50	15.60	74	95	1	101.96	15.30	72

The results mirrored the full study. Larger ranges were recorded on the OLSAT, and both groups had higher means and SD on the OLSAT. The means were similar for both groups on each of the tests they took. Group I, the largest group, had smaller mean scores on both tests than did Group II. Independent *t* tests ($p < .05$, 209) showed it did not make any difference in which order the students took the test. The observed *t* values were 1.81 for the NNAT and -1.54 for the OLSAT. There was no order effect influencing the results of the tests.

Previously Identified Gifted Students

Sixteen students had previously been identified by the district as gifted with most using the lower levels of the Otis Lennon School Ability Test. All students were administered both tests as part of the study. How did these students do on these two measures of ability (Table VII)?

For this group, the ranges were similar on both tests, 26 on the NNAT and 29 on the OLSAT. Standard deviations were under 10 for each test, but the SD on the OLSAT was lower. There was almost a 12 point difference for the means. Most of these students scored less well on the NNAT; only 3 students had higher scores on the NNAT (Appendix E).

TABLE VII

NNAT AND OLSAT MEANS, STANDARD DEVIATIONS, AND RANGES OF ABILITY SCORES FOR PREVIOUSLY IDENTIFIED GIFTED STUDENTS

Test	n	M	SD	Range
NNAT	16	113.94	9.22	26
OLSAT	16	125.63	8.69	29

A Pearson *r* was conducted and showed no significant correlation between the two tests for these students ($r = .21$). A dependent t^* test was conducted. The observed value of t^* was -4.160. The difference between the scores for this group of students was significantly different ($p > .05$, 15). Students previously identified with the OLSAT had significantly lower scores on the NNAT.

Discrepancies Between Test Scores

During the compilation of the data, it was noticed that some students had fairly substantial differences in the school ability indexes on the two different measures. It was discovered that 116 students had a discrepancy of .5 standard deviations or more between the two test scores. How many students had discrepancies and how large were they (Table VIII)?

The OLSAT has a mean of 100 and a SD of 15. The NNAT reports a mean of 100 and a SD of 16. For this study 8 points was considered .5 SD, 15 points was considered 1 SD, 23 points was used for 1.5 SD, and 30 points was equal to 2 SD.

TABLE VIII

NUMBER OF STUDENTS WITH LARGE DISCREPANCIES BETWEEN NNAT AND OLSAT SCORES

Highest Test Score	+.5 SD	+1 SD	+1.5 SD	+2 SD
Naglieri Nonverbal Ability Test	26	16	6	2
Otis Lennon School Ability Test	28	27	10	1
TOTALS	54	43	16	3

Using stanine scores the tests were compared to highlight how a child's placement might have been changed based on the use of only one of the scores. Stanine scores are clumped together as low ability (1,2,3), average ability (4,5,6), and high ability (7,8,9).

Using stanine scores, 26 students would have dropped from the high to the average range, while 22 students would have been classified low instead of average. Table IX highlights the differences in stanine scores between the two tests.

TABLE IX

STANINE DIFFERENCES FOR STUDENTS SCORING MORE THAN ONE STANDARD DEVIATION DIFFERENCE BETWEEN OLSAT AND NNAT SCORES

1 Stanine	2 Stanines	3 Stanines	4 Stanines
5	26	21	8

Summary

The study was conducted to determine the suitability of the NNAT and the OLSAT for use in the identification of students who may be gifted but are at-risk due to SES factors or minority status. A lack of minority subjects in the study changed its course. The study then focused more on the differences between students as a result of their SES status.

Results were not as expected on the NNAT for Low SES students. It was expected that these students would score significantly better on the NNAT because of its nonverbal tasks, but in fact the Low SES group had almost identical means on the two tests. For Caucasian children low SES was not a factor in the outcome of test scores on the NNAT, but it was a significant factor for the OLSAT scores.

Previously identified gifted children did not fare as well on the NNAT as on the OLSAT. There was a statistically significant difference between the scores on their NNAT and the OLSAT.

The discovery of large discrepancies between scores on the two tests for many subjects was a surprising find. Since the two tests are measuring school ability it would be

expected that scores would be similar for most children on the two tests. Almost one-third of the subjects had differences of 1 standard deviation or more.

CHAPTER V

DISCUSSION

The purpose of this study is to compare a group verbal ability test and a group nonverbal ability test for use in identifying at-risk students as G/T. This chapter begins with the theoretical basis of the study. A discussion of the results of each research question tested will be presented. It discusses additional questions that were asked after the data had been collected. Implications which may be drawn based upon the data are presented. After the limitations of the study are noted, suggestions for further research are offered.

Theoretical Basis of the Study

The Marland (1972) definition recognized that children could be identified as gifted based on demonstrated achievement or potential in any one of the following areas: general intellectual ability, specific academic ability, creative or productive thinking, leadership ability, and visual or performing arts. While almost half of the students identified for gifted programs come from the highest economic status homes, gifted students come from all socioeconomic levels and all ethnic groups (Ross, 1993). They can be found in every community and school.

Knowing these diverse gifted children exist is not enough. These students have special academic, social, and emotional needs that are going unmet. The real challenge for a district is locating the students in need of the specialized services that differentiates content, product, and process.

For many districts identification is a difficult task to undertake, because of the

many ways in which students can be gifted. Classroom teachers and school counselors, with no formal training in gifted education, may have difficulty in correctly identifying the gifted child. Districts may also have difficulty in choosing appropriate screening and identification instruments for the various areas of giftedness, and very often the district personnel responsible for choosing test instruments are neither trained in assessment nor in gifted education. It is highly likely that instruments will be chosen and used inappropriately to identify the various areas of giftedness--intellectual ability, creative thinking, specific academic ability, visual or performing arts, and leadership (Alvino, McDonnel, & Richert, 1981).

Students who are at a disadvantage using a verbal test will often be missed during screening and identification for gifted and talented programs (O'Conner, 1989). These students will then be denied opportunities that may make crucial educational and financial differences for the student, his or her family, the community, and the nation (Smith, LeRose, & Clasen, 1991).

The researcher was interested in the NNAT because it was new on the market and no test reviews were available at the time the test was administered. It was being sold by the publisher as a way to identify gifted children who may have difficulty with verbal ability tests due to insufficient verbal abilities.

Discussion of the Results

There was curiosity about how the OLSAT, a test primarily of verbal ability, and the NNAT, a test of nonverbal ability would compare for use in identifying gifted and talented students. The study used 211 fifth grade subjects who were tested with both tests in a split-half format over a 2 to 3 week period. Students were divided into two groups based on SES status. Low SES was determined by qualifying for free or reduced lunch price. Because more stratified SES status could not be determined for the remaining students, they were classified as All Others.

Question 1

How do the scores of the NNAT compare to the OLSAT? There was no statistically significant difference between the test scores for all students. There was a greater range of scores on the OLSAT (76 vs. 61). The difference in ranges between the two tests could be a result of differences in the amount of time allowed to complete the test, the number of items on the test, and the types of items (verbal vs. nonverbal). The NNAT requires 30 minutes to complete 38 nonverbal items, and the OLSAT allows 40 minutes to work 72 verbal and nonverbal items.

Initially it was thought the difference in range size might be due to the difference in test length. Students may have had difficulty completing the OLSAT due to its length. In reality, there was only a one point difference between the low scores with 62 for the OLSAT and 61 for the NNAT. Instead the differences were at the high end of the scale with a high scores of 138 for the OLSAT and 128 for the NNAT. Students with scores at the high end on the OLSAT were not able to produce similar scores on the NNAT.

Questions 2, 3, & 4

How does SES and ethnicity influence nonverbal cognitive ability? How does SES and ethnicity influence verbal cognitive ability? How does the NNAT compare to the OLSAT for SES and ethnicity?

The socioeconomic level of the child may produce higher or lower test scores on academic aptitude tests (Cunningham, 1986). SES made a statistically significant difference for the students in this study on both the OLSAT and the NNAT. Seely (1993) cites poverty as a major risk factor affecting school environment. Even on the test of nonverbal ability, where they were expected to perform better, the Low SES students had significantly lower scores than the All Others group. It was expected that they would have been closer to the All Others group on the NNAT because of the use of nonverbal tasks that did not require the use of reading comprehension that is often an

underdeveloped skill for at-risk students.

Minority groups were inadequately represented in this study and ethnicity could not be examined. The Caucasian group did have an adequate number of subjects. Because two-thirds of all poor children are white (Pianta & White, 1996), information concerning SES and ethnicity was developed. It was discovered that low SES Caucasian students performed statistically differently on the OLSAT than did the All Others group. On the NNAT there was no statistical difference in the two groups performance. These results supports the findings of Borland and Wright (1994). This district should be cautious about the use of the OLSAT when attempting to identify gifted students from Low SES backgrounds. The NNAT may be a fairer test for low SES students, but because of its high ceiling it may be inadequate for use in finding low SES students who may be gifted.

The Hispanic group had higher mean scores on the OLSAT than on the NNAT. This was unexpected for the Hispanic group, because it had been surmised from the literature review that Hispanic students, due to language difficulties, would probably do better on tests of nonverbal ability. The district believed that because its Hispanic population is largely Mexican American and migrant, these children would need nonverbal tests for identification. Such a small number of Mexican American students were included, it is impossible to generalize from the study's results to a larger or more diverse Hispanic population. Additionally there was no data available as to whether these students were living in traditional Hispanic households or in households that were aculturalized in the majority culture. Today many people identify themselves as Hispanic even though they cannot speak the Spanish language.

Only the Native American group scored a slightly higher mean on the NNAT than the OLSAT. A higher mean was expected on the NNAT because the research studies cited by Sisk (1987) showed Native American students displayed superior or relatively high visual-spatial functioning. Again, the small number of Native American subjects in

the study does not allow one to generalize to a larger population.

Additional Research Questions

As the data was being analyzed, new questions were asked regarding the outcome of the test scores. The questions concerned the order effect on the scores, previously identified gifted students, and the large discrepancies between scores for some students.

Order Effect on Scores

Did the order in which the tests were taken affect the outcome of the scores? The order in which the tests were administered made no significant difference in the outcome of the scores. The NNAT and the OLSAT could be used as part of a battery of tests to screen for gifted students. Probably because these tests are so different in format, the scores from one test would not influence the scores of the other.

Previously Identified Gifted Students

How did the students who had previously been identified for by the district as gifted and talented compare on the NNAT and the OLSAT? There was a significant difference between the scores on the two tests for this group. They scored significantly higher on the OLSAT.

The state of Oklahoma requires a total composite score of 97% on ability tests for automatic qualification for G/T programs. The district follows this guideline, but additional students may be considered for placement under a multi-criteria plan with a 95%. If these students' placement had been decided by this study, 7 of these students would have missed the cut off score using either of the tests. None of the students would have been automatically placed using the NNAT. Fortunately for these students, the school district does not require students to continually requalify for gifted services, but it raises the question of why over half of these students would not have requalified for the

program.

Was the difference from the study's scores and the students' original placement scores due to how the students were initially placed? Four of the students had originally been placed using either OLSAT verbal or nonverbal subtest scores of 97%. Three had been accepted using qualifying scores from another district. Nine had originally been placed using full scale Otis Lennon SAI scores.

The students knew the district was conducting a study on the two tests. They had been encouraged to do their best on both tests, but they knew their placement would not be negatively affected by the test results. Was the resulting scores do to the fact that some of the students did not consider the testing important?

Two of the students who did not requalify were no longer active in the gifted program. They had been withdrawn by parent request after refusing, over the parents' objections, to attend resource room classes. One of the two had a history of excessive absences from school. These students, knowing the tests were being given to qualify students for gifted programs, may have purposefully not done their best so parental pressure would not force them back into the gifted program.

Large Score Differences for Students

Both tests are designed to measure school ability and are closely related to school achievement. Since both tests are measuring school ability, albeit differently, one might expect less fluctuation between scores for an individual. The most unexpected discovery was finding huge discrepancies between scores for some subjects. How many students had discrepancies and how large were they?

In this study 62 subjects had differences between the two test scores of 1 SD or more (Table VII). An additional 54 students had differences in scores of one-half standard deviation. Over half the students in this study were included on Table VII. If these tests are used to identify children for placement in any special educational programs

or to assign them to tracked programs based on ability, students may be misplaced.

The results also point out

the danger in the way in which districts arrive at multi-criteria designations. If districts choose to give more than one measure of ability, it is very apparent that weighting the scores (Richert, et al., 1982) or summing the scores would be disastrous for the subjects in this study because of the huge differences in student's scores from one test to another. Districts need to look closely at this practice and either limit it or discontinue it.

Limitations of the Study

This study was limited because existing data from school records was used. The researcher had no control over many situations. The researcher could not control the test administration procedures, could not compile more detailed information on SES status, nor had access to the original test documents.

Test Administration

The researcher had no control over the way in which the tests were administered. The day of the week and the time of day the test was given could have affected the outcome of the scores. Often Mondays are not good days to give tests because children are tired from the weekend. Giving tests on a Friday or just before a school vacation is also not an optimal time, because students are not as focused on what is happening in the classroom. The time of day can also be a factor. If it is just before lunch or a recess break, students are focusing in on that rather than the task at hand.

While the counselor held a meeting with the teachers to discuss test administration, the researcher was not part of the process and has no knowledge of what the teachers were told about administering the test. A veteran teacher missed most of the meeting and it was from her group for which data could not be collected for the study because of an irregularity in the test administration.

There was no set time when all teachers and students were testing. Teachers were given the option of administering the test at some point during the morning, working around the schedules in their classroom so that they would not miss their break times. The teacher in whose class the irregularity occurred broke for lunch ten minutes before the end of the testing session and before all students had completed the test. Testing was resumed after lunch.

Data

The researcher was unable to collect data that might have helped enhance this study. Not having more detailed information about the SES level of the students was a disadvantage. Stratification of income level was not possible. The researcher could not tell which students came from the most advantaged situations. It was not apparent how long the Low SES students had been so classified. It is possible that the students in this study were only temporarily on the free and reduced lunch due to family situations such as divorce, job loss, or illness of a family member. Students who may have lived in intergenerational poverty could not be identified. There is also the possibility that some of these students were not actually Low SES but had parents who cheated the system through falsification of information. It is not known how thorough the district is in verifying the information given by the parent or guardian of a child when it comes to applying for free and reduced lunch.

Another drawback of the data collection was with the test scores. While the OLSAT and NNAT are tests of school ability, one is primarily a verbal ability test and the other is a nonverbal ability test. The OLSAT can report a verbal and a nonverbal subtest. The district does not break down scores in that way, because the state of Oklahoma requires the use of a total composite score. Original test documents had been destroyed making it impossible for the researcher to compute this information. It would have been helpful to compare the nonverbal subtest score of the OLSAT with the NNAT.

The researcher did not have access to records concerning learning disabilities or reading scores status, making it impossible to determine if some of the students' difficulties with the tests were due to their inability to read and comprehend the tests or to a disability in an area that was covered by items on the test.

The study was limited in any meaningful reporting of ethnicity data for culturally diverse students because the available district contained few minorities.

Recommendations for Further Research

The NNAT needs more research as to its suitability for identifying gifted and talented children. The fact that the NNAT only identified one student out of 211 and none of the previously identified gifted students causes one to wonder if it will identify only those students at the very highest intelligence levels. If that is the case then it may be a way to discriminate between the moderately and highly gifted individuals. What kind of gifted children does the NNAT locate? Does the NNAT produce similar results to an individual test of intelligence? Is the NNAT useful for discriminating at the higher levels of giftedness?

More research is required on Hispanic students with regards to this test. Hispanic students come from many different cultural groups. Research should be conducted on the NNAT to determine if is appropriate for use with these various groups.

More study of the use of the NNAT for use with Native American groups should be conducted. In this study only the Native American group had a higher mean score on the NNAT. In Oklahoma many people are classified as Native American due to the unusual way in which this state was settled. Since Oklahoma was initially set up as Indian Territory, many of today's residents can trace their ancestry to one of the Indian groups that were settled here. Even a small percentage of Indian blood will affiliate an individual with an Indian nation. The Native American groups of Oklahoma do not live on reservations and so their culture is more assimilated into the white culture than one would

find in regions where Native Americans have traditionally been forced onto reservations. There were not enough subjects in the group to generalize to a larger population.

Sisk (1987) cited research with Native American students displaying high visual spatial functioning. Is the NNAT, with its visual-spatial tasks useful in identifying Native American students? Is it more suitable for students from some Native American groups than for other Native American groups? When conducting this research, the various tribal groups and the circumstances in which the groups live should be considered.

Some districts requalify their gifted students periodically. One year a student may be served in gifted programming and the next year he or she may not be reclassified as not being gifted. Will the NNAT display similar results with other previously identified students as it did in this study? Are the differences only in comparison with the Otis Lennon or do these differences exhibit themselves when comparisons are made to other tests of ability?

Because the researcher used archival school district data and did not have any control in the testing situation, there are questions about how the testing situation may have affected the outcome of the study. In a more controlled testing situation, with less variation in test administrators and more control over the time period in which the testing takes place, will the NNAT and OLSAT display similar results?

The OLSAT can produce verbal and nonverbal subtest scores. This data was not available to the researcher. How does the nonverbal subtest of the OLSAT compare to the full scale score of the NNAT? How does the NNAT compare to a test that is more similar such as the Raven's Matrices? How does the NNAT compare to other tests of nonverbal ability?

Districts must study their demographics and search out and use tests suitable for the students that they serve. What may be suitable for a suburban district like the one in this study, may be totally inappropriate for a disadvantaged district in an inner city or poor rural area. Does the type of school or the location of the school--suburban, rural, or inner

city make a difference on the results of the NNAT and the OLSAT? Would the same results appear in a school district that is more educationally disadvantaged than the district used in this study? Would similar results appear in different circumstances?

More research should be undertaken with the OLSAT concerning low SES children. Will the results of this study be duplicated in other settings?

Summary

School districts looking for instruments to use in identifying gifted and talented students from diverse backgrounds must do their homework and study research and test reviews about the tests they are considering. They cannot rely on test publishers to determine what is most suitable for their purpose. The NNAT was in the catalog and being sold even before the technical manual was available.

The most disturbing part of the study was the large discrepancy (1 sd or more) between scores for almost one-third of the subjects. It points out how damaging testing information can be when it is used to label children, particularly if a district is relying on only one test to make a determination about a child's placement.

Pegnato and Birch (1959) demonstrated that districts must be concerned with not only the efficiency of the test in identifying gifted students, but also in its effectiveness. No students were automatically qualified by the NNAT as gifted. The OLSAT is a time tested instrument that may not discriminate at the higher ranges particularly when districts do not test out of level, but it was more efficient and effective in identifying gifted students in this study than the NNAT. The NNAT at this time has no studies reported nor any test reviews in print. It has not been proven in this instance to be effective or efficient in identifying gifted students.

There was no significant difference between the two tests for the entire group, but there were significant differences recorded for students who are Low SES when using the OLSAT. Care should be taken when using the OLSAT in evaluating results when looking

at low SES children.

If districts use different measures to identify gifted students who are significantly different from each other, they must be careful to recognize whom they are identifying and the needs of those students and refrain from providing a one-size fits all programming option. If different tests are identifying different kinds of abilities, then programming options must be provided that suit the students' identified gifts or talents.

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APPENDIXES

APPENDIX A

RECORDS REVIEW FORM

STUDENT ID #:_____

RECORDS REVIEW FORM
AN INVESTIGATION OF A NONVERBAL ABILITY MEASURE

TEST SCORES: TEST ORDER: OLSAT_____NNAT_____

	SAI	Percent	Stanine	NCE	RAW SCORE
OLSAT	_____	_____	_____	_____	_____
NNAT	_____	_____	_____	_____	_____

GENDER: Y _____ Z _____

AGE: YEARS_____MONTHS_____

SES STATUS: GH_____ IJ_____

ETHNICITY: ____A ____B ____C ____D ____E

PREVIOUSLY IDENTIFIED GIFTED: _____K _____L

APPENDIX B

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD APPROVAL

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD

DATE: 10-01-98 **IRB #: ED-99-023**

Proposal Title: AN INVESTIGATION OF THE EFFECTIVENESS OF A NONVERBAL ABILITY MEASURE TO IDENTIFY AT-RISK GIFTED CHILDREN

Principal Investigator(s): Diane Montgomery, Helen Jean Vargus

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

Signature: Carol Olson Date: October 7, 1998

Carol Olson, Director of University Research Compliance
cc: Helen Jean Vargus

Approvals are valid for one calendar year, after which time a request for continuation must be submitted. Any modification to the research project approved by the IRB must be submitted for approval. Approved projects are subject to monitoring by the IRB. Expedited and exempt projects may be reviewed by the full Institutional Review Board.

APPENDIX C

SCHOOL DISTRICT PERMISSION TO USE ARCHIVAL DATA

I, Marion E. Bayles, hereby authorize Helen Vargus, or associates or assistants of her choosing, to perform research using archival school district data.

Archival school district data will be used to analyze the results of two tests, the Otis Lennon School Ability Test (OLSAT) and the Naglieri Nonverbal Ability Test (NNAT). Data will be considered in relation to Socioeconomic status (SES), as defined by participation in the free or reduced lunch program, ethnic background, and the current status of a student in gifted education placement. Steps will be taken to ensure confidentiality for all subjects. All data will be recorded on a Data Record Form (Attachment A), and no data will be made part of any record related to this study that can be identified with any subject.

1. All student names will be randomly assigned a number from 001 to approximately 225.
2. Ages will be recorded in years and months.
3. Ethnic backgrounds will be letter coded as follows: A-Native American, B-Caucasian, C-Black, D-Hispanic, E-Oriental.
4. The SES categories will be coded using a two letter code: GH-Low SES (as defined by free or reduced lunch participation) and IJ-High SES.
5. Gender will be classified with a letter code: Females-Y and Males-Z.
6. The status of a student's current participation in a gifted program will be classified as follows: K-yes, L-No
7. Data will be collected in numerical form for the following scores on both the OLSAT and the NNAT: School Ability Index (SAI), Percentile, Stanine, Raw Score, and Normal Curve Equivalent (NCE).

There is no risk to any subject through the use of the archival data. The researcher will not have direct contact with any subject in order to gather data.

The school district will benefit from the research, in that it may be better able to identify the type of instruments that may be most appropriate for use in the identification of at-risk students who are gifted and talented. Significant findings may result in the dissemination of information through the Oklahoma Association of Gifted, Creative, and Talented (OAGCT) to other gifted coordinators throughout the state of Oklahoma.

This is done as part of an investigation entitled An Investigation of the Effectiveness of a Nonverbal Ability Measure to Identify At-Risk Gifted Children.

The purpose of this study is to determine if a nonverbal ability test can aid in the identification of G/T students who may be considered at-risk. This study seeks to determine if the NNAT is more effective than the OLSAT in the identification of students who may be considered at-risk.

I understand that participation is voluntary, that there is no penalty for refusal for the district to participate in this project, and that the district is free to withdraw its consent and participation in this project at any time without penalty after notifying the project director.

I may contact Helen Vargus at Brassfield Elementary, Bixby, OK; Telephone: (918)366-2267. I may also contact University Research Services, 001 Life Sciences East, Oklahoma State University, Stillwater, OK 74078; Telephone: (405)744-5700.

I have read and fully understand the consent form. I sign it freely and voluntarily. A copy has been given to me.

Date: 04-29-98 Time: 08:25 AM

Signature: Marvin Bayless

District Position: Asst. Supt.

"I hereby certify that I have personally explained all elements of this form to the subject or his/her representative before requesting the subject or his/her representative to sign it."

Signed: Helen J. Vargus

Project Director

I, Donald E. Kindle, hereby authorize Helen Vargus, or associates or assistants of her choosing, to perform research using archival school district data.

Archival school district data will be used to analyze the results of two tests, the Otis Lennon School Ability Test (OLSAT) and the Naglieri Nonverbal Ability Test (NNAT). Data will be considered in relation to Socioeconomic status (SES), as defined by participation in the free or reduced lunch program, ethnic background, and the current status of a student in gifted education placement. Steps will be taken to ensure confidentiality for all subjects. All data will be recorded on a Data Record Form (Attachment A), and no data will be made part of any record related to this study that can be identified with any subject.

1. All student names will be randomly assigned a number from 001 to approximately 225.
2. Ages will be recorded in years and months.
3. Ethnic backgrounds will be letter coded as follows: A-Native American, B-Caucasian, C-Black, D-Hispanic, E-Oriental.
4. The SES categories will be coded using a two letter code: GH-Low SES (as defined by free or reduced lunch participation) and IJ-High SES.
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I have read and fully understand the consent form. I sign it freely and voluntarily. A copy has been given to me.

Date: 11/17/97 Time: 3:30 p.m.

Signature: Howard E Hunsaker

District Position: Principal/Superintendent Bixby Jr. High

"I hereby certify that I have personally explained all elements of this form to the subject or his/her representative before requesting the subject or his/her representative to sign it."

Signed: Helen J. Vargus

Project Director

APPENDIX D

CODE SHEET FOR RECORDS REVIEW FORM

CODE SHEET

AN INVESTIGATION OF A NONVERBAL ABILITY MEASURE

GENDER

Male	Z
Females	Y

SES STATUS

Low SES	GH
High SES	IJ

ETHNICITY

Native American	A
Caucasian	B
Black	C
Hispanic	D
Oriental	E

PREVIOUSLY IDENTIFIED GIFTED

Yes	K
No	L

APPENDIX E

INDIVIDUAL OLSAT AND NNAT SCORES FOR PREVIOUSLY IDENTIFIED GIFTED STUDENTS

TABLE X

INDIVIDUAL OLSAT AND NNAT SCORES FOR PREVIOUSLY IDENTIFIED GIFTED STUDENTS

Student Number	OLSAT X	NNAT Y	X-Y
205	138	108	30
49	135	108	27
35	123	100	23
67	119	100	19
41	132	114	18
177	120	103	17
163	123	106	17
187	138	122	16
197	121	110	11
159	126	119	7
55	133	126	6
194	128	122	6
170	131	126	5
43	109	119	-10
44	123	126	- 3
56	111	114	- 3

VITA

Helen Jean Vargus

Candidate for the Degree of

Master of Science

Thesis: AN INVESTIGATION OF THE EFFECTIVENESS OF A NONVERBAL ABILITY MEASURE TO IDENTIFY AT-RISK GIFTED CHILDREN

Major Field: Applied Behavioral Studies

Biographical:

Personal Data: Born in Muscatine, Iowa, On August 22, 1948, the daughter of Wilma and Bert Etter; married to Larry Vargus in 1967, the mother of Melissa and Gregory.

Education: Graduated from Muscatine High School, Muscatine, Iowa in June, 1966; attended Muscatine Community College, 1966-68; received a Bachelor of Science degree in Elementary Education from University of Tulsa, Tulsa, Oklahoma in May, 1982. Completed the requirements for the Master of Science degree with a major in Gifted Education at Oklahoma State University in December, 1998.

Experience: Employed by Bixby Public Schools for 11 years as a classroom educator in sixth grade language arts and fourth grade and 5 years as a elementary gifted education coordinator and educator; have conducted staff development workshops on gifted education for district teachers.

Professional Memberships: Bixby Education Association; Oklahoma Education Association; National Education Association; Oklahoma Association of Gifted, Creative and Talented; National Association for Gifted Children.